

Listing of Claims

1. (Amended) A lightweight, low density fiber comprising:  
a polyester copolymer ~~for providing~~ having a greater elasticity than a corresponding monomer-based polyester;  
more than thirty five percent functional void fraction in the form of foam-forming cells for reducing the density of the fiber as compared to a solid fiber;  
at least five void cells per axial cross section for increasing the structural integrity of the fiber as compared to less uniform foams; and  
submicron-sized particles of an inert nucleating agent, present in an amount less than 10 percent by weight.
2. A foamed fiber according to Claim 1 wherein said inert nucleating agent is selected from the group consisting of fluorocarbon polymers, polytetrafluoroethylene, and silicone.
3. A foamed fiber according to Claim 1 having a denier of between about 6 and 15.
4. A foamed fiber according to Claim 1 having between about 50 and 75% functional void fraction.
5. A foamed fiber according to Claim 1 having between about 6 and 30 cells per cross section.
6. A foamed fiber according to Claim 1 having a smooth surface.
7. A foamed fiber according to Claim 1 having a fibrillated surface for increasing the moisture transfer capabilities of the fiber.

8. A foamed fiber according to Claim 1 having a channeled surface.
9. A foamed fiber according to Claim 1 having a pitted surface.
10. A foamed fiber according to Claim 1 wherein said copolymer comprises polyester and polyethylene glycol, with the polyethylene glycol being present in an amount of between about 6 and 10 percent by weight.
11. A foamed fiber according to Claim 1 having a density of between about 0.4 and 0.6 g/cm<sup>3</sup>.
13. A foamed fiber according to Claim 1 having open and closed cells.
14. A fabric comprising fibers according to Claim 1.
15. A fabric according to Claim 14 selected from the group consisting of woven fabrics, knitted fabrics and non-woven fabrics.
16. A foamed fiber according to Claim 1 comprising about one percent by weight of said submicron particles of fluorocarbon polymer.
17. A lightweight, low density foamed fiber according to Claim 1 consisting essentially of:
  - a copolymer of polyester and polyethylene glycol in which the glycol is present in an amount of between about 6 and 10 percent by weight;
  - between about fifty and seventy five percent functional void fraction;
  - between about 6 and 30 cells per axial cross section; and

submicron-sized particles of polytetrafluoroethylene, present in an amount less than 10 percent by weight.

18. A foamed fiber according to Claim 17 having a density of between about 0.4 and 0.6 g/cm<sup>3</sup>.

19. A fabric comprising fibers according to Claim 17 and selected from the group consisting of woven fabrics, knitted fabrics and non-woven fabrics.

20. A low density, light weight fiber according to Claim 1 comprising a non-uniform surface for providing additional mechanical properties to the foamed fiber as compared to corresponding smooth surface fiber.

21. A fabric formed from the foamed fiber according to Claim 20 and selected from the group consisting of woven fabrics, non-woven fabrics, and knitted fabrics.

22-39 (Withdrawn)

40. A self-crimping filament comprising:  
a polyester copolymer;  
at least about 40% void space by volume  
more than 5 cells per axial cross section; and  
different degrees of orientation along at least two adjacent longitudinal portions of the filament.

41. A self-crimping filament according to Claim 40 comprising between about 45 and 75% void space by volume.

42. A self-crimping filament according to Claim 40 wherein said polyester copolymer comprises between about 6 and 10 percent by weight of polyethylene glycol.

43. A self-crimping filament according to Claim 40 comprising between about 6 and 30 cells per axial cross section.

44. A self-crimping filament according to Claim 40 comprising submicron sized solid particles of a fluorocarbon polymer in an amount not exceeding about two percent by weight.

45. A self-crimping filament according to Claim 40 having a denier of between about 6 and 15.

46. A self-crimping filament according to Claim 40 having a density of between about 0.4 and 0.6 grams per cubic centimeter.

47. A fabric formed from the self-crimping filament according to Claim 40 and selected from the group consisting of woven fabrics, non-woven fabrics and knitted fabrics.

48. A low density light weight fiber comprising:  
a polyester copolymer for providing a greater elasticity than a corresponding monomer-based polyester;  
a hollow core for reducing the overall density of the fiber compared to a solid fiber;  
and  
a foamed sheath for further reducing the overall density as compared to a solid-sheath hollow fiber.

49. A low density light weight fiber according to Claim 48 wherein said polyester copolymer comprises polyethylene glycol present in an amount of between about 6 and 10 percent by weight.

50. A low density light weight fiber according to Claim 48 comprising submicron sized particles of a fluorocarbon polymer and present in an amount not exceeding two percent by weight.

51. A low density light weight fiber according to Claim 48 wherein said foamed sheath has a void fraction of at least about 35 percent by volume.

52. A low density light weight fiber according to Claim 48 having a density of between about 0.3 and 0.7 grams per cubic centimeter.

53. A low density light weight fiber according to Claim 48 having a density of between about 0.45 and 0.55 grams per cubic centimeter.

54. A fabric formed from the fiber according to Claim 48 and selected from the group consisting of woven fabrics, non-woven fabrics and knitted fabrics.

55. A low density fiber comprising:  
polyester; and  
irregular longitudinal surface effects that in length are at least an order of magnitude greater than the average diameter of the fiber and that in width are at least an order of magnitude smaller than the average diameter of the fiber.

56. A low density fiber according to Claim 55 having a density no greater than 1.10 grams per cubic centimeter.

57. A low density fiber according to Claim 55 having a density no greater than 0.75 grams per cubic centimeter.

58. A low density fiber according to Claim 55 comprising a copolymer of polyester and polyethylene glycol in which the polyethylene glycol is present in an amount of between about 6 and 10 percent by weight.

59. A low density fiber according to Claim 55 comprising submicron particles of a fluorocarbon polymer present in an amount of no more than about 2 percent by weight.

60. A fabric formed from the low density fiber according to Claim 55 and selected from the group consisting of woven fabrics, non-woven fabrics, and knitted fabrics.

61-73 (Withdrawn)